AF 2613

TRANSMITTAL OF APPEAL BRIEF (Large Entity)	Docket No. EN9010004US

In re Application Of: **Boice et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/888,964	06/25/2001	Tung T. Vo	30400	2613	1429

Invention: **MULTIPLE PARALLEL ENCODERS AND STATISTICAL ANALYSIS THEREOF FOR ENCODING A VIDEO SEQUENCE**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **June 30, 2005**

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Dated: **July 21, 2005**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Boice et al.	:	Group Art Unit: 2613
Serial No.:	09/888,964	:	Examiner: Tung T. Vo
Filed:	June 25, 2001	:	Appeal No.:

Title: MULTIPLE PARALLEL ENCODERS AND STATISTICAL ANALYSIS THEREOF FOR ENCODING A VIDEO SEQUENCE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief – Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 21, 2005.

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To: Mail Stop Appeal Brief – Patents
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Brief of Appellants

Dear Sir:

This is an Appeal from a final rejection, dated March 29, 2005, rejecting claims 1-16, 18-30 & 32-38, all of the claims pending in this application. This Brief is accompanied by a transmittal letter authorizing the charging of Appellants' deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.17(c).

Appellants' Brief is believed to be in compliance with the requirements set forth in 37 C.F.R. §41.37(c). However, if Appellants' Brief does not comply with the requirements set forth in 37 C.F.R. §41.37(c), Appellants' request notification of the reason for non-compliance and an opportunity to file an amended Brief pursuant to 37 C.F.R. §41.37(d).

Real Party in Interest

This application is assigned to **International Business Machines Corporation** by virtue of an assignment executed by the co-inventors on June 21, 2001 and June 19, 2001, and recorded with the United States Patent and Trademark Office at reel 011954, frame 0574, on June 25, 2001. Therefore, the real party in interest is **International Business Machines Corporation**.

Related Appeals and Interferences

To the knowledge of the Appellants, Appellants' undersigned legal representative, and the assignee, there are no other appeals or interferences, which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on June 25, 2001, with the U.S. Patent and Trademark Office. As filed, the application included thirty-nine (39) claims, of which three (3) were independent (i.e., claims 1, 18 & 32).

In an initial Office Action dated April 30, 2004, claims 1-9, 11-24 & 16-39 were rejected under 35 U.S.C. §102(b) as being anticipated by Park et al. (U.S. Patent No. 5,528,628; hereinafter Park), while claims 1-12, 17-26 & 31-39 were rejected under 35 U.S.C. §102(b) as being anticipated by Suzuki (U.S. Patent No. 5,850,527; hereinafter Suzuki). In Appellants' response dated July 26, 2004, independent claims 1, 18 & 32 were amended, and dependent claims 17, 31 & 39 were canceled.

In a Communication mailed October 27, 2004, a Notice of Non-Compliant Amendment was issued since each claim in Appellants' response dated July 26, 2004, did not provide a proper status identifier. In a Supplemental Response to Office Action mailed November, 8, 2004, Appellants re-submitted their response dated July 26, 2004, with an appropriate status identifier for each pending claim.

In the final Office Action dated March 29, 2005, independent claims 1, 18 & 32 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement; claims 1-16, 18-30 & 32-28 were rejected under 35 U.S.C. §102(e) as being anticipated by Boroczky et al. (U.S. Patent No. 6,859,496 B1; hereinafter Boroczky); claims 1-12, 17-27 & 32-38 were rejected under 35 U.S.C. §102(b) as being anticipated by Suzuki as set forth in the previous Office Action dated April 30, 2004; and claims 13-16 & 28-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki, and further in view of Park. In Appellants' Response to Office Action dated April 25, 2005, no claims were amended.

An Advisory Action issued June 15, 2005, responsive to Appellants' April 25, 2005 request for reconsideration of the final Office Action. The Advisory Action indicated that Appellants' request did not place the application in condition for allowance.

A Notice of Appeal to the Board of Patent Appeals and Interferences was mailed on June 28, 2005. The Notice of Appeal was received at the United States Patent and Trademark Office on June 30, 2005. The status of the claims is therefore as follows:

Claims allowed – none;

Claims objected to – none;

Claims rejected – 1-16, 18-30 & 32-38; and

Claims canceled – 17, 31 & 39.

Appellants are appealing the rejection of claims 1-16, 18-30 & 32-38.

Status of Amendments

Appellants proffered no amendments responsive to the final Office Action dated March 29, 2005. The claims as set out in the Appendix include all prior entered claim amendments.

Summary of Claimed Subject Matter

In one aspect of the invention, Appellants claim a system (e.g., independent claim 1) for encoding a sequence of video frames. The system includes multiple encoders 620 (FIG. 6), 820 (FIG. 8) connected in parallel and a controller 630, 830 coupled to the multiple encoders. Each encoder receives the sequence of video frames 610, 810 for encoding thereof, and each encoder of the multiple encoders employs a set of encode parameters (see, e.g., paragraphs [0049] – [0052]). At least one encode parameter of the sets of encode parameters is varied between at least two encoders of the multiple encoders connected in parallel (see, e.g., paragraph [0048]). The controller selects one set of encode parameters from the sets of encode parameters which best meets an encode objective (see, e.g., paragraphs [0052] – [0053]). The system further includes means for outputting 650, 670, 850, 870 a bitstream of encoded video data encoded from the sequence of video frames using the one set of encoded parameters (see, e.g., paragraphs [0053] – [0054]). Further, the controller includes means for automatically adapting an encode parameter in one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective 750 (FIG. 7; and see, e.g., paragraphs [0057] & [0060]).

In a further aspect of the present invention, Appellants claim a method (e.g., independent claim 18) and a program storage device (e.g., independent claim 32) for encoding a sequence of video frames. The method includes: encoding the sequence of video frames employing multiple parallel connected encoders 620 (FIG. 6), 820 (FIG. 8), each encoder of the multiple encoders receiving the identical sequence of video frames 610, 810 for encoding thereof, wherein each encoder of the multiple encoders employs a set of encoder parameters (see, e.g., paragraphs [0049] – [0052]), at least one encode parameter of the sets of encode parameters being varied between at least two encoders of the multiple encoders connected in parallel (see, e.g., paragraph [0048]); selecting one set of encode parameters from the sets of encode parameters employed by the multiple parallel connected encoders which best meets an encode objective (see, e.g., paragraphs [0052] – [0053]); outputting a bitstream of encoded video data 650, 670, 850, 870 encoded from the sequence of video frames using the one set of encode parameters (see, e.g., paragraphs [0053] – [0054]); and wherein the selecting further includes automatically adapting

an encode parameter in one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective 750 (FIG. 7; and see, e.g., paragraphs [0057] & [0060]).

In another aspect of the invention, Appellants claim a system (e.g., dependent claim 2), method (e.g., dependent claim 19), and program product (e.g., dependent claim 33) wherein the sequence of video frames is a single channel bitstream of video data 610, 810. In a further aspect, Appellants claim a system (e.g., dependent claim 13), such as recited in independent claim 1, wherein the means for outputting further includes means for outputting an encode result of the encoder of the multiple encoders 820 employing the selected one set of encode parameters (see, e.g., paragraph [0063]), wherein the encoded result is the bitstream of encoded video data, and wherein the means for outputting further includes multiple buffers 825. Each buffer is connected to an output of a respective encoder of the multiple encoders 820, and the system further includes means for forwarding 827, 845 a buffered encode result of the encoder having the selected one set of encode parameters (see, e.g., FIG. 8, and paragraphs [0062] – [0064]). A method (e.g., dependent claim 28), is also provided such as recited in independent claim 18, wherein the outputting further includes selecting an encoded result of an encoder of the multiple encoders 820 employing the selected one set of encoder parameters (see, e.g., paragraph [0063]), wherein the encoded result is a bitstream of encoded video data, and wherein the outputting includes buffering 825 the encoded results produced by the multiple encoders, and forwarding for output the buffered encoded result of the encoder employing the selected one set of encode parameters (see, e.g., FIG. 8, and paragraphs [0062] – [0064]).

Grounds of Rejection to Be Reviewed On Appeal

1. Whether claims 1, 18 & 32 were validly rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

2. Whether claims 1-16, 18-30 & 32-38 were anticipated under 35 U.S.C. §102(e) by Boroczky.

3. Whether claims 1-12, 17-27 & 32-38 were anticipated under 35 U.S.C. §102(b) by Suzuki.

4. Whether dependent claims 13-16 & 28-30 were rendered obvious under 35 U.S.C. §103(a) to one of ordinary skill in the art by Suzuki, as applied to claims 1, 12, 18 & 27, and further in view of Park.

Argument

I. Rejection Under 35 U.S.C. §112, First Paragraph:

The final Office Action states a 35 U.S.C. §112, first paragraph, rejection to claims 1, 18 & 32 for failing to comply with the written description requirement. Reversal of this rejection is respectfully requested.

A decision of whether an invention has been sufficiently enabled requires determination of "whether one reasonably skilled in the art could make or use the invention from disclosures in the patent coupled with information known in the art without undue experimentation." United States v. Telectronics, Inc., 827 F.2d 778, 785; U.S.P.Q.2d 1217, 1223 (Fed. Cir. 1988). Further, a patent need not teach, and preferably omit, what is well known in the art. In ew Buchner, 929 F.2d 660, 661; 10 U.S.P.Q.2d 1331, 1332 (Fed. Cir. 1991); Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802, F.2d 1367, 1384; 231 U.S.P.Q. 81, 94 (Fed. Cir. 1986), *Cert. Denied*; 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463; 221 U.S.P.Q.2d 481, 489 (Fed. Cir. 1984).

If a statement of utility in the specification contains within it a connotation of how to use, and/or the art recognizes that standard modes of administration are known and contemplated, 35 U.S.C. §112 is satisfied (emphasis added). In re Johnson, 282 F.2d 370, 373; 127 U.S.P.Q. 216, 219 (CCPA 1960); In re Hitchings, 342 F.2d 80, 87; 144 US.P.Q. 637, 643 (CCPA 1965); and In re Brana, 51 F.2d 1560, 1566; 34 U.S.P.Q.2d 1437, 1441 (Fed. Cir. 1993).

Moreover, the Manual of Patent Examining Procedure (MPEP) §2164.03 states:

> The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification.
>
> ...
>
> The "predictability or lack thereof" in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention.
>
> ...
>
> Accordingly, what is known in the art provides evidence as to the question of predictability.

Appellants respectfully submit that both judicial decisions and the MPEP are counter to the Examiner's position with respect to the adequacy of disclosure of the present invention. Further, the Examiner has not shown a reasonable basis for questioning the adequacy of disclosure to enable a person of ordinary skill in the art to make and use the claimed invention. The specification is in compliance with the enablement requirement of 35 U.S.C. §112, first paragraph, since the specification discloses a parallel look-ahead encode system in FIG. 6, wherein an imbedded controller 630 implements the processing of FIG. 7. Since the imbedded controller 630 is implementing the logic of FIG. 7, the functions described therein are necessarily "automatic" as would be understood in the art. That is, one of ordinary skill in the art understands that a controller or processor implementing software proceeds automatically through the instructions of the software or logic.

Paragraph [0057] of the specification states, in part:

> FIG. 7 is a high level flowchart of one embodiment of processing implemented by, for example, controller 630 of encode system 600 of FIG. 6. ...

Paragraph [0060] of the specification further states, in part:

> ... If the objective is unmet, then the controller adapts at least one encode parameter in one or more of the parallel encoders 750 with the goal of meeting the objects with the next selected set of encode parameters.

Since the specification teaches that the controller implements the logic of FIG. 7, and teaches that when the objective is unmet, that the controller adapts at least one encode parameter in the one or more of the parallel encoders with the goal of meeting the objective with the next selected set of encode parameters, Appellants submit that the specification discloses the invention in a manner sufficient for one of ordinary skill in the art to understand the "automatic" nature of the adaptation performed by the controller. The logic of FIG. 7 is a software flowchart as can be understood from a reading of the specification, as well as from paragraph [0070], which indicates that one or more program of instructions executable by the machine may be provided to perform the capabilities of the present invention.

In view of the above, and since the Examiner has provided no reasonable basis for questioning the enablement provided for the claimed invention, Appellants respectfully submit that one of ordinary skill in the art could make and use the claimed invention from the disclosure in the specification, and that the pending claim language is fully supported by the application as filed. Appellants submit that the adequacy of disclosure of the present invention is supported by both judicial decisions and the MPEP, as well as the level of understanding of a person of ordinary skill in the art.

Based on the foregoing, withdrawal of the 35 U.S.C. §112, first paragraph, rejection to claims 1, 18 & 32 is respectfully requested.

II. Rejection Under 35 U.S.C. §102(e) over U.S. Patent No. 6,859,496 B1 to Boroczky:

A. Independent claims 1, 18 & 32:

Reversal of the rejection to claims 1-16, 18-30 & 32-38 as being anticipated by Boroczky is respectfully requested.

Appellants request reconsideration and withdrawal of the anticipation rejection on the following grounds: (1) the final Office Action has misinterpreted the teachings of Boroczky, thus voiding the basis for the rejection; (2) the Boroczky patent fails to disclose Appellants' claimed invention; and (3) the Boroczky patent itself lacks any teaching, suggestion or incentive for its further modification as necessary to achieve Appellants' recited invention.

In one aspect, Appellants' invention is directed to a system for encoding a sequence of video frames (e.g., claim 1). The system includes multiple encoders connected in parallel, each encoder receiving the sequence of video frames for encoding thereof. Further, each encoder employs a set of encode parameters, with at least one encode parameter of the sets of encode parameters being varied between at least two encoders of the multiple encoders connected in parallel. The system further includes a controller coupled to the multiple encoders for selecting one set of encode parameters from the sets of encode parameters which best meets an encode objective, and means for outputting a bitstream of encoded video data encoded from the sequence of video frames using the one set of encode parameters. The system further includes means for automatically adapting an encode parameter in the one or more encoders of the multiple encoders when no set of the encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective. This automatic adapting allows for optimization of the set of encode parameters for use in encoding the sequence of video frames should one of the sets of encode parameters employed by the multiple encoders not meet the encode objective.

The commonly assigned Boroczky patent discloses a control strategy for dynamically encoding multiple streams of video data in parallel for multiplexing onto a constant bit-rate channel. The control strategy allows individual encode bit-rates to be dynamically adjusted for each video data stream based in part on relative complexity of the multiple streams of video data, as well as fullness of compressed video data buffers and a channel buffer coupled between the encoders and the constant bit-rate channel. The control strategy includes analyzing the multiple streams of video to determine relative complexity thereof, encoding the multiple streams of video streams in parallel, and dynamically adapting encoding of at least one stream of the video frames based on the relative complexity of the video frames. The bit-rate for each stream of video frames is only changed at GOP boundaries, or if a scene change occurs. The calculated bit-rate is preferably further modified based on the buffer fullness. (See Abstract of Boroczky.)

Initially, Appellants submit that the final Office Action misinterprets the teachings of Boroczky. In Fig. 3 of Boroczky, multiple pre-processors 205 are shown each receiving a different program source (source 1, source 2 ... , source n). However, the final Office Action states "... each encoder to receive the sequence of video frames for encoding thereof (210, enc.

1-enc. n) ..." Therefore, Appellants respectfully submit that the Office Action misconstrues the teachings of Boroczky. As indicated in Fig. 3 thereof, each encoder receives a different delayed source of video frames. Thus, Boroczky does not teach Appellants' claimed invention, since Appellants recite, in part, in each independent claim that "each encoder receives the sequence of video frames for encoding thereof ..." In Appellants' invention, the sequence of video frames is fed to each encoder (i.e., the same sequence), as is clear from the language of the claims. No similar teaching or suggestion is provided by Boroczky. For at least this reason, Appellants request reconsideration and withdrawal of the anticipation rejection to their independent claims based on the teachings of Boroczky.

Further, Appellants submit that the Boroczky patent fails to disclose Appellants' claimed invention. Appellants recite, e.g., in claim 1, a controller coupled to the multiple encoders for selecting one set of encode parameters from the sets of encode parameters which best meets an encode objective. No similar functionality is taught or suggested by Boroczky. Further, the final Office Action provides no explanation as to why this particular functionality is believed to be anticipated by the joint rate control block 230 in the system of Fig. 3 of Boroczky. Thus, Appellants request reversal of the anticipation rejection to their independent claims based on the teachings of Boroczky.

Still further, Appellants' independent claims recite, in part, means for automatically adapting an encode parameter in one or more of the encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective. A careful reading of Boroczky fails to uncover any similar teaching or suggestion. Notwithstanding this, the final Office Action points to Fig. 5 of Boroczky, and in particular, step 390 as allegedly teaching Appellants' recited functionality. This characterization of the teachings of Boroczky is respectfully traversed. Step 390 of Fig. 5 of Boroczky merely determines whether the current frame is at a GOP boundary of the stream of video frames being encoded at encoder ENC i (see column 14, lines 35-46). This functionality has no relevance to Appellants' claimed processing of the independent claims. There is no determination in Boroczky that no sets of the encode parameters employed in the parallel encoding of the same stream of video frames fails to provide an encoded result which meets an encode objective. Absent such consideration, Appellants respectfully submit that

Boroczky cannot anticipate or even render obvious the functionality recited in the independent claims presented. For this additional reason, reconsideration and withdrawal of the anticipation rejection to the independent claims based on Boroczky is respectfully requested. There is no automatic adaptation of an encode parameter in Boroczky conditioned on the multiple encoders encoding the same stream of video data failing to produce an encoded result which meets an encode objective.

Still further, Appellants respectfully submit that Boroczky lacks any teaching, suggestion or incentive for its further modification as necessary to achieve Appellants' recited invention. The express purpose of the Boroczky patent is to dynamically encode multiple streams of video data in parallel for multiplexing onto a constant bit-rate channel. In contrast, Appellants' invention involves encoding in parallel the sequence of video frames, wherein each encoder of the multiple encoders employs a set of encode parameters to differently encode the sequence (with at least one encode parameter of the sets of encode parameters being varied between two or more encoders of the multiple encoders connected in parallel). Thus, to modify Boroczky to achieve Appellants' claimed invention would be contrary to the intended purpose of the Boroczky patent.

Yet further, various characterizations of the teachings of Boroczky provided in the final Office Action provide no technical basis outside that contained in Appellants' own specification. As noted above, various characterizations of the teachings of Boroczky in particular merely assert the language of Appellants' invention in hindsight. Thus, the rejection violates the well-known principle that Appellants' own disclosure cannot be used as a reference against them.

For the above reasons, Appellants respectfully request reversal of the anticipation rejection to claims 1-16, 18-30 & 32-38 based on Boroczky.

B. Dependent Claims 2-16, 19-30 & 33-38:

The final Office Action fails to state a *prima facie* case of anticipation against Appellants' dependent claims 2-16, 19-30 & 33-38 based on Boroczky. No rationale for rejecting these claims based on Boroczky is provided in the Office Action. Thus, Appellants respectfully request withdrawal of the rejection to these claims based on Boroczky.

Each of the dependent claims recites a further characterization of Appellants' invention, many of which further distinguish the claimed invention from the teachings of Boroczky. For example, dependent claims 2, 19 & 33 recite that the sequence of video frames is a single channel bitstream of video data. In accordance with their respective independent claims, this single channel bitstream of video data is fed to the multiple encoders connected in parallel. Clearly, this characterization distinguishes Appellants' invention from any teaching or suggestion in Boroczky. As noted above, each preprocessor in Boroczky receives a different program source (source 1, source 2 ... source n). Therefore, the Boroczky patent teaches away from Appellants' claimed invention wherein a single channel bitstream of video data is fed to each of the multiple parallel connected encoders. Since Boroczky does not teach or suggest the above-noted aspect of Appellants' recited invention, and since the Office Action provides no explanation of the anticipation rejection based thereon, withdrawal of the rejection to these dependent claims is requested.

III. Rejection Under 35 U.S.C. §102(b) over U.S. Patent No. 5,850,527 to Suzuki:

Appellants respectfully submit that the rejection of claims 1-12, 17-27 & 32-38 under 35 U.S.C. §102(b) as being anticipated by Suzuki is erroneous, and request reversal of this rejection for at least the reasons set forth below.

Suzuki discloses an information providing apparatus which identifies a transmission enabled band of a transmission line and selects information conforming to the band, thereby effectively utilizing the transmission band of the transmission line.

Appellants respectfully submit that a careful reading of Suzuki fails to uncover any discussion or suggestion of a mechanism for automatically adapting an encode parameter of one or more encoders of multiple parallel connected encoders when no set of the encode parameters produces an encoded result which meets the encode objective. In this regard, the final Office Action references band detection unit 9a of Fig. 5 of Suzuki, as well as the "detecting unit" of Fig. 19. These characterizations of the teachings of Suzuki are respectfully traversed.

Relative to Appellants' automatically adapting, the final Office Action states:

"... S2 of Fig. 19, e.g., the line seizing is automatically feedback to the step S1 when there is no line seizing."

Figure 19 of Suzuki is described at column 15, line 66 – column 16, line 54. Specifically, Suzuki teaches (in part):

> Figs. 19 & 20 are flowcharts showing the procedure of, in the case where the transmission lines in Fig. 5 are changeable lines, indicating to a user program which can be provided in accordance with the state of the bands of the lines by the control unit 5, and providing one of the programs. In the flowcharts, the operations of the user conducted on the terminal device are also shown. The control unit 5 always monitors the lines in order to provide a program to a user (step S1). The user seizes a line in order to inquire whether an appropriate program is available. The control unit 5 judges whether the user seizes a line or not (step S2). If NO, the process returns to step S1. If YES, the transmission band management table is referred to (step S3), and an available band is detected by subtracting the occupied band from the transmission band of the line so as to judge whether the available band exists or not from the subtraction result (step S4) ...

Thus, line seizing in Suzuki refers to a user seizing a line in order to inquire whether an appropriate program is available. This teaching has no relevance to Appellants' recited automatic adaptation conditioned on the functionality recited in the independent claims. In Appellants' approach, there is an automatic adaptation of one or more encode parameters of one or more sets of encode parameters employed by the multiple parallel connected encoders when no set of encode parameters produces an encoded result which meets the defined encode objective. The band detection unit 9a in Suzuki and the line seizing of Fig. 19 do not relate to adaptation of an encode parameter *per se*, let alone to automatic adaptation conditioned as recited by Appellants in the independent claims presented. The band detection unit 9a is connected to transmission line 6a through 6j to detect bands of signals under transmission in the transmission lines, and then supply the information to the control unit 5 (see column 8, lines 57-60 of Suzuki, as well as column 11, lines 7-10). This detecting means does not relate to, nor does it suggest, Appellants' recited functionality for automatically adapting one or more encode parameters in a set of encode parameters employed in the multiple parallel connected encoders.

Further, Appellants respectfully submit that Suzuki teaches away from any automatic adaptation of the encode parameters by teaching that the encoders 71, 72 through 7m (to which the reproduced information is supplied) are compressing units compressing the information to be provided, and compress the supplied information at a predetermined compressing rate or by a predetermined compression method (see column 8, lines 30-35 of Suzuki). Since the compression rate and compression method are both predetermined, there can be no automatic adaptation of an encode parameter employed by one or more of the multiple parallel connected encoders 71, 72, 7m.

For at least the above reasons, Appellants respectfully submit that the claims presented patentably distinguish over the teachings of Suzuki. Withdrawal of the anticipation rejection based thereon is therefore requested.

IV. Rejection Under 35 U.S.C. §103(a) over U.S. Patent No. 5,850,527(to Suzuki)in view of U.S. Patent No. 5,528,628 (to Park) :

Reversal of the rejection to dependent claims 13-16 & 28-30 as obvious over Suzuki as applied to claims 1, 12, 18 & 27, and further in view of Park is respectfully requested.

These claims are believed allowable for the same reasons noted above in connection with their respective independent claims, as well as for their own additional characterizations. These claims further recite that the means for outputting includes multiple buffers, each buffer being connected to an output of a respective encoder of the multiple encoders, and means for forwarding a buffered encoded result of the encoder having the selected one set of encode parameters.

The final Office Action notes that Suzuki does not teach multiple buffers, wherein each buffer comprises memory for storing encoded video data comprising at least one encoded frame of the sequence of video frames, and switching between the buffered encoded video data to provide to a subsystem encoder as recited by Appellants. To address this deficiency, the teachings of Park are cited. Without acquiescing to the characterizations of the teachings of Park, it is noted that the Park patent does not address the above-noted deficiencies of Suzuki when applied against the independent claims at issue. Thus, these dependent claims are believed

allowable for the same reasons noted above with respect to the independent claims from which they directly, or ultimately depend. Withdrawal of the obviousness rejection to these claims is therefore respectfully requested.

Conclusion

Appellants request reversal of the 35 U.S.C. §112, §102(e), §102(b) & §103(a) rejections of claims 1-16, 18-30 & 32-38 set forth in the final Office Action. Appellants respectfully submit that their independent claims are described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors at the time that the application was filed had possession of the claimed invention. Additionally, Appellants respectfully submit that Boroczky, Suzuki and Park, individually or in combination, do not anticipate or render obvious their invention.

Accordingly, reversal of all rejections is respectfully requested.

Respectfully submitted,

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Dated: July 21, 2005.

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Claims Appendix

1. A system for encoding a sequence of video frames comprising:

multiple encoders connected in parallel, each encoder to receive the sequence of video frames for encoding thereof, wherein each encoder of said multiple encoders employs a set of encode parameters, at least one encode parameter of the sets of encode parameters being varied between at least two encoders of the multiple encoders connected in parallel;

a controller coupled to the multiple encoders for selecting one set of encode parameters from the sets of encode parameters which best meets an encode objective;

means for outputting a bitstream of encoded video data encoded from the sequence of video frames using said one set of encode parameters; and

wherein said controller further comprises means for automatically adapting an encode parameter in one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective.

2. The system of claim 1, wherein said sequence of video frames comprises a single channel bitstream of video data.

3. A system of claim 1, wherein the set of encode parameters employed by each encoder of said multiple encoders comprises a predetermined static set of parameters.

4. The system of claim 3, wherein the set of encode parameters employed by each encoder of said multiple encoders includes at least one of:

a bit rate for a resultant encoded stream;

field or frame encoding;

group of picture (GOP) structure, including number of B pictures and distance between I pictures; and

3:2 pull down inversion.

5. The system of claim 1, wherein said controller selects the set of encode parameters which yields the best picture quality as measured by a picture quality indicator (PQI), wherein the encode objective comprises best picture quality.

6. The system of claim 1, wherein said bitstream of encoded video data is produced by said system in a single pass of said sequence of video frames through said system.

7. The system of claim 1, wherein said controller ascertains the encode objective from a plurality of possible encode objectives.

8. The system of claim 7, wherein the encode objective comprises one of best picture quality, constant picture quality, VBV buffer fullness, constant bits per picture, constant bit rate (CBR), transrating/transcoding, or variable bit rate encoding (VBR).

9. The system of claim 1, wherein the set of encode parameters employed by each encoder of the multiple encoders comprises at least one of the following parameters: bit rate; field or frame encoding; GOP structure; 3:2 PDI; target bits per picture; predicted average mquant; search range; promote P to I; demote I to P; average activity; and VBV buffer fullness.

10. The system of claim 1, wherein said controller comprises means for user selection of the encode objective, and user initialization of one or more encode parameters in the sets of encode parameters employed by the multiple encoders.

11. The system of claim 1, wherein said means for outputting comprises an encode subsystem for subsequently encoding the sequence of video frames using said one set of encode parameters to produce said bitstream of encoded video data.

12. The system of claim 1, wherein said means for outputting comprises means for outputting an encode result of an encoder of the multiple encoders employing said selected one set of encode parameters, wherein said encoded result comprises said bitstream of encoded video data.

13. The system of claim 12, wherein said means for outputting comprises multiple buffers, each buffer connected to an output of a respective encoder of said multiple encoders, and means for forwarding a buffered encoded result of the encoder having the selected one set of encode parameters.

14. The system of claim 13, wherein each buffer comprises memory for storing encoded video data comprising at least one encoded frame of the sequence of video frames.

15. The system of claim 14, wherein each buffer of said multiple buffers comprises memory for holding a number of encoded frames of the sequence of video frames sufficient to allow said controller to select said encoded result which best meets the encode objective.

16. The system of claim 13, further comprising an encode subsystem, and means for switching between said means for selecting and said encode subsystem, wherein said bitstream of encoded video data can be taken as an output of one encoder of said multiple encoders, or can comprise an output of said encode subsystem as determined by said means for switching.

18. A method of encoding a sequence of video frames comprising:

encoding the sequence of video frames employing multiple parallel connected encoders, each encoder of the multiple encoders receiving the identical sequence of video frames for encoding thereof, wherein each encoder of the multiple encoders employs a set of encode parameters, at least one encode parameter of the sets of encode parameters being varied between at least two encoders of the multiple encoders connected in parallel;

selecting one set of encode parameters from the sets of encode parameters employed by the multiple parallel connected encoders which best meets an encode objective;

outputting a bitstream of encoded video data encoded from the sequence of video frames using the one set of encode parameters; and

wherein said selecting further comprises automatically adapting an encode parameter in one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective.

19. The method of claim 18, further comprising receiving the sequence of video frames across a single channel of video data.

20. The method of claim 18, wherein the set of encode parameters employed by each encoder of said multiple encoders includes at least one of:

a bit rate for a resultant encoded stream;

field or frame encoding;

group of picture (GOP) structure, including number of B pictures and distance between I pictures; and

3:2 pull down inversion.

21. The method of claim 18, wherein said bitstream of encoded video data is produced in a single pass of said data through said encoding.

22. The method of claim 18, further comprising ascertaining the encode objective from a plurality of possible encode objectives prior to selecting said one set of encode parameters from the sets of encode parameters employed by the multiple parallel connected encoders.

23. The method of claim 22, wherein the encode objective comprises one of best picture quality, constant picture quality, VBV buffer fullness, constant bits per picture, constant bit rate (CBR), transrating/transcoding, or variable bit rate encoding (VBR).

24. The method of claim 18, wherein the set of encode parameters employed by each encoder of the multiple encoders comprises at least one of: bit rate; field or frame encoding; GOP structure; 3:2 PDI; target bits per picture; predicted average mquant; search range; promote P to I; demote I to P; average activity; and VBV buffer fullness.

25. The method of claim 18, wherein said selecting comprises user selecting of the encode objective, and user initialization of one or more encode parameters in the sets of encode parameters employed by the multiple encoders.

26. The method of claim 18, wherein said outputting comprises subsequently encoding the sequence of video frames using the one set of encode parameters to produce said bitstream of encoded video data.

27. The method of claim 18, wherein said outputting comprises selecting an encoded result of an encoder of the multiple encoders employing the selected one set of encode parameters, wherein the encoded result comprises the bitstream of encoded video data.

28. The method of claim 27, wherein said outputting comprises buffering encoded results produced by the multiple encoders, and forwarding for output the buffered encoded result of the encoder employing the selected one set of encode parameters.

29. The method of claim 28, wherein said buffering comprises storing one or more encoded frames of the sequence of video frames sufficient to allow the selecting of the encoded result which best meets the encode objective.

30. The method of claim 28, further comprising switching between said selecting a buffered encoded result, and subsequently encoding the sequence of video frames using the selected set of encode parameters, wherein said bitstream of encoded video data can be taken as output of one encoder of said multiple encoders, or can comprise an output of an encode subsystem performing said subsequent encoding.

32. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of encoding a sequence of video frames, the method comprising:

encoding the sequence of video frames employing multiple parallel connected encoders, each encoder of the multiple encoders receiving the identical sequence of video frames for encoding thereof, wherein each encoder of the multiple encoders employs a set of encode parameters, at least one encode parameter of the sets of encode parameters being varied between at least two encoders of the multiple encoders connected in parallel;

selecting one set of encode parameters from the sets of encode parameters employed by the multiple parallel connected encoders which best meets an encode objective;

outputting a bitstream of encoded video data encoded from the sequence of video frames using the one set of encode parameters; and

wherein said selecting further comprises automatically adapting an encode parameter in one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective.

33. The at least one program storage device of claim 32, further comprising receiving a sequence of video frames across a single channel of video data.

34. The at least one program storage device of claim 32, wherein said bitstream of encoded video data is produced in a single pass of said data through said encoding.

35. The at least one program storage device of claim 32, further comprising ascertaining the encode objective from a plurality of possible encode objectives prior to selecting said one set of encode parameters from the sets of encode parameters employed by the multiple parallel connected encoders.

36. The at least one program storage device of claim 34, wherein the encode objective comprises one of best picture quality, constant picture quality, VBV buffer fullness, constant bits per picture, constant bit rate (CBR), transrating/transcoding, or variable bit rate encoding (VBR).

37. The at least one program storage device of claim 32, wherein said outputting comprises subsequently encoding the sequence of video frames using the one set of encode parameters to produce said bitstream of encoded video data.

38. The at least one program storage device of claim 32, wherein said outputting comprises selecting an encoded result of an encoder of the multiple encoders employing the selected one set of encode parameters, wherein the encoded result comprises the bitstream of encoded video data.

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